

THE DIFFERENCE BETWEEN THE PAST AND THE FUTURE

There are at least three distinct fundamental asymmetries between past and future in our everyday experience of the world: a thermodynamic asymmetry, an epistemic asymmetry and an asymmetry of intervention. The thermodynamic asymmetry encompasses all of the time-directedness in the behaviors of the sorts of systems that make up the traditional subject-matter of physics – it accounts (for example) for the tendency of smoke to spread out, and of temperatures to equilibrate, and of paper to yellow with age, and of mechanical devices to wear down, and so on. The epistemic asymmetry has to do with the fact that the sorts of things we are able to find out about the future are altogether different than the sorts of things we are able to find out about the past, and that the *means* by which we are able to find things out about the future are altogether different than the means by which we are able to find things out about the past. And the asymmetry of intervention has to do with our impression of *openness* of the future and the *settledness* of the past – it has to do with our intuition that by acting now, we can affect the future but not the past. The first of these asymmetries has been the focus of intensive and fruitful scientific investigation for more than a century now, but the business of thinking seriously about the other two has only gotten underway over the past few years. It now appears that there may be a simple and elegant and unified statistical-mechanical explanation of all three.